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Spanish validation of the Basic Psychological Needs at Work Scale: A measure to predict teachers' well-being in the workplace

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Abstract The present study aimed to validate a Spanish-version of the Basic Psychological Needs at Work Scale (BPNWS-Sp) and to examine the associations between needs satisfaction and engagement and burnout in secondary education teachers. Using a sample of 584 secondary education teachers, the results supported the three-factor model, composite reliability, measurement invariance, and nomological validity of the BPNWS-Sp. This study contributes to validating the first instrument in Spanish to measure the satisfaction of the three BPNs separately in secondary education teachers. The measurement of teachers' BPNs could effectively provide guidance for school policies to improve teaching and learning.

Keywords Secondary education teachers · Basic psychological needs · Teacher well-being

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Résumé. Validation espagnole de l'échelle des besoins psychologiques basiques au travail: Une mesure de prédiction du bien-être au travail. Le but de cette étude est de valider une version espagnole de l'échelle des besoins psychologiques basiques au travail (BPNWS-Sp) et d'examiner les associations de la satisfaction des besoins et de l'engagement avec le burnout chez les enseignements du degré secondaire. L'échantillon se composait de 584 enseignants du degré secondaire, les résultats étaient favorables au modèle de trois facteurs, à la fiabilité de construit, à l'invariance de mesure et la validité nomologique du BPNWS-Sp. Cette étude contribue à la validation du premier instrument espagnol pour mesurer individuellement les trois besoins psychologiques basiques chez les enseignants du degré secondaire. Cet instrument pourrait fournir des indications sur les polices scolaires de manière à améliorer l'enseignement et l'apprentissage.

Zusammenfassung. Spanische Validierung der Skala der psychologischen Grundbedürfnisse an der Arbeit: Ein Mittel um das Wohlbefinden von Lehrern am Arbeitsplatz vorherzusagen. Das Ziel der Studie war es, eine spanische Version der Skala der psychologischen Grundbedürfnisse an der Arbeit (BPNWS-Sp) zu validieren und die Zusammenhänge zwischen Bedürfnissbefriedigung, Engagement und Burn-out bei Lehrern der Sekundarstufe zu überprüfen. Die Resultate, die auf einer Befragung von 584 Sekundarlehrern beruhen, unterstützen das Drei-Faktoren Modell, kongenerische Reliabilität, Messungsinvarianz, und nomologische Validität von der BPNWS-Sp. Diese Studie trägt dazu bei, das erste Instrument auf Spanisch zu validieren, welches die Befriedigung von den drei psychologischen Grundbedürfnissen bei Sekundarlehrern auf separate Weise misst. Die Erhebung der psychologischen Grundbedürfnisse von Lehrern könnte als Orientierung für Schulvereinbarungen dienen, um das Unterrichten und Lernen zu verbessern.

Resumen. Validación española de la Escala de Necesidades Psicológicas Básicas en el trabajo: Una medida para la predicción del bienestar docente en el puesto de trabajo. El presente estudio pretende validar la versión española de la Escala de Necesidades Psicológicas Básicas en el trabajo (BPNWS-Sp) y examinar la asociación entre la satisfacción de las necesidades, el compromiso y el *burnout* en el profesorado de educación secundaria. Utilizando una muestra de 584 profesores de secundaria, los resultados dieron soporte al modelo de tres factores, a la fiabilidad del constructo, a la invariancia de medida y a la validez nomológica de la BPNWS-Sp. Este estudio contribuye a la validación del primer instrumento en español para la medición de la satisfacción de las tres necesidades psicológicas básicas de manera separada en el profesorado de secundaria. La escala de las necesidades psicológicas básicas en el profesorado puede contribuir eficázmente en la creación de políticas escolares que faciliten la mejora tanto de la enseñanza como del aprendizaje.

Introduction

The concept of need is one of the most traditional terms used to explain the behavior of people at work. Chronologically, Murray (1938) was the first researcher to claim the existence of some acquired needs such as social recognition and power. Unlike Murray, Maslow (1954) supported the presence of five innate and hierarchically organized needs, noteworthy among which is self-realization. However, the proposal that has received the greatest scientific backing to explain the basic needs was put forward by Deci and Ryan (1985, 2000), and it is decisive in order to understand behavior at work.

Self-determination theory and teachers

During the last few years, the number of studies about teachers' well-being has increased considerably (e.g., Collie & Martin, 2017; Janke, Nitsche, & Dickhäuser, 2015; Van den Berghe et al., 2014) under the self-determination framework (SDT; Deci & Ryan, 1985, 2000). SDT defines the needs for autonomy, competence, and relatedness as the three innate and universal psychological needs that human beings must satisfy to optimize their personal development, their well-being, and their health. *Autonomy* refers to people's desire to feel they are the origin of their actions. *Competence* refers to people's perceived ability when faced with a situation in a specific context. Finally, *relatedness* refers to the importance of social inclusion and of having positive interpersonal relations (Deci & Ryan, 2000).

In this sense, SDT (Deci & Ryan, 1985) puts forward that the three basic psychological needs (BPNs) at work must be satisfied in order to develop greater self-determined teaching motivation (Janke et al., 2015; Ruiz-Quiles, Moreno-Murcia, & Vera, 2015). One factor that may influence teachers' experienced need satisfaction is the support of BPN by the educational administration, headmasters, other teachers, and students (Boudrias et al., 2014; Deci, Olafsen, & Ryan, 2017). Thus, teachers, who perceive that they can choose and assume responsibility for actions concerning school development and the teaching process (*autonomy need*), perceive they have sufficient resources to successfully cope with their working demands (*competence need*), and feel more integrated with the rest of their colleagues (*relatedness need*), may be more intrinsically motivated towards their work.

Moreover, teachers' BPN satisfaction can influence the classroom management styles and students' achievements (Marshik, Ashton, & Algina, 2016). Likewise, past studies with teachers have shown that the satisfaction of the three BPNs is positively correlated to a needs-supportive teaching style (Van den Berghe et al., 2014) and with a teaching style centered on students learning (Janke et al., 2015). In addition, satisfying the BPNs could be determinant for teachers' psychological health (Boudrias et al., 2014; Brien et al., 2012; Desrumaux et al., 2015), as recent research has indicated a positive relationship between BPN satisfaction and optimism (Boudrias et al., 2014; Brien et al., 2012; Desrumaux et al., 2015), job

satisfaction (Ruiz-Quiles et al., 2015), and enjoyment at work (Klassen, Perry, & Frenzel, 2012).

Teachers' well-being: Engagement and burnout

Engagement and burnout have been analyzed as the most relevant indicators of teachers' well-being at the workplace (Parker, Martin, Colmar, & Liem, 2012). On one hand, engagement is characterized by a high level of energy and identification with work, and it is defined as a positive multifactorial mental state made up of vigor, dedication, and absorption (Schaufeli, Martínez, Marques-Pinto, Salanova, & Bakker, 2002). Within the teaching context, vigor is characterized by teachers with high energy levels and resilience. Dedication is shown by teachers who are involved in their work and are very enthusiastic about their profession. Finally, absorption is reflected by teachers who have a feeling of flow and concentration in their work.

On the other hand, burnout is characterized as a syndrome that can be expressed gradually and in a differentiated manner depending on the context where it originates (Montero-Marín, Skapinakis, Araya, Gili, & García-Campayo, 2011). Thus, three factors have been defined in order to understand it: overload, lack of development, and neglect. These result from prolonged exposure to chronic stress in a particular workplace (Montero-Marín et al., 2011). Within the teaching context, overload is characterized by teachers who neglect their personal lives to seek good results in their work. Lack of development is shown in teachers who perceive difficulties to progress and who wish to do other jobs to be able to promote their occupational skills. Finally, neglect is characterized by teachers who are not very engaged and who are indifferent to any situation in their work (Montero-Marín et al., 2011). These burnout factors are explained by Montero-Marín et al. (2011) as being very similar to the traditional components of the syndrome indicated by Maslach and Jackson (1986) (i.e., exhaustion, depersonalization, and inefficacy). However, the traditional definition of Maslach and Jackson (1986) tends to unify burnout, possibly generalizing the results encountered, making it difficult to deal with them.

Teachers' basic psychological needs

Based on the SDT, numerous studies have associated the satisfaction of the BPNs with workers' engagement and burnout (Van den Broeck, Ferris, Chang, & Rosen, 2016). However, in the teaching context, and to our knowledge, there is only one study that has analyzed the relationship between the satisfaction of the three BPNs and engagement at work (Klassen et al., 2012). Thus, with a sample of 455 teachers, Klassen et al. (2012) showed how the satisfaction of the three BPNs significantly explained engagement at work. However, whilst autonomy and competence positively explained engagement, relatedness to colleagues explained it negatively. In this regard, more studies that analyze the role played by the relatedness need in teachers' engagement at work seems necessary.

In addition, recent studies have found a negative relationship in teachers between the satisfaction of the three BPNs and burnout at work. Thus, with a sample of 201

teachers, Van den Berghe et al. (2014) found significant and negative correlations between the satisfaction of the three BPNs, exhaustion, and depersonalization. Likewise, in this study, efficacy was significantly and positively correlated to the three BPNs. These findings indicate the importance that the satisfaction of the three BPNs could have on teachers' well-being and psychological health. Moreover, a study conducted by Sevil, Aibar, Abós and García-González (2017) showed that teachers' BPN satisfaction was positively related to student motivation and achievement.

Measurement of the basic psychological needs in teachers

Grounded in SDT, numerous instruments have been designed to assess the satisfaction of the BPNs in different contexts. In the work context, some of the most commonly used scales have been the Intrinsic Need Satisfaction (INS; Leone, 1995, in Baard, Deci, & Ryan, 2004), the Work-Related Basic Need Satisfaction (W-BNS; Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010), and the Basic Psychological Needs at Work Scale (BPNWS; Brien et al., 2012). The INS (Baard et al., 2004) contains 23 items, seven of which represent autonomy satisfaction, eight competence satisfaction, and eight relatedness satisfaction. It was used with North American bank workers and showed adequate psychometric properties (See further information Baard et al., 2004). The W-BNS (Van den Broeck et al., 2010) was an ad hoc creation that included both basic need satisfaction and frustration items using Dutch-speaking Belgian workers. Whereas the need satisfaction items showed a good fit for the data, the psychometric properties relating to need frustration items were not so good (See further information Van den Broeck et al., 2010). A possible explanation could be that the need frustration items were based on an absence of need satisfaction (e.g., "At work, I can talk with people about things that really matter to me"). Other authors (e.g., Brien et al., 2012) recommended positive statements (e.g., "I feel other people dislike me") of the Psychological Need Thwarting Scale (PNTS; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011) in order to measure the frustration of the BPNs, rather than negative statements of satisfaction of the BPNs (e.g., Van den Broeck et al., 2010).

The development of the BPNWS (Brien et al., 2012) was based on three different scales. Items referring to autonomy were selected from Morin's (2002) scale. The items related to competence, despite being ad hoc creations of Brien et al. (2012), were inspired by the INS (Baard et al., 2004). Finally, relatedness items were taken directly from the perceived social relatedness scale (Échelle du Sentiment d'appartenance Sociale, ÉSAS; Richer & Vallerand, 1998). The BPNWS (Brien et al., 2012), apart from being validated in French with 271 Canadian workers, was simultaneously validated with a joint sample of 488 Canadian and 363 French teachers from different education levels. They found good psychometric properties in a work context with specific characteristics such as teaching. It thus became the first instrument, according to SDT, to evaluate the satisfaction of BPNs in the teaching context. This scale has also been used by other researchers in their respective studies with teachers (Boudrias et al., 2014; Desrumaux et al., 2015). Recently, Sánchez-Oliva et al. (2016) adapted the BPNWS version to Portuguese in

a specific sample of 366 exercise professionals, showing good psychometric properties.

However, despite the appropriate properties shown by the BPNWS (Brien et al., 2012) in later research studies, the authors suggested, within the limitations of the validation study, some perspectives to refute and extend the findings. Thus, Brien et al. (2012) sustain that the explanatory capacity of each one of the BPNs that have other outcomes should be examined, highlighting the need to be validated in other cultures and languages. Furthermore, they point out the importance of longitudinal designs that can test the stability of the scale.

The present study

To the authors' knowledge, there are no instruments in Spanish that, from the viewpoint of the SDT, exclusively measure the satisfaction of the three BPNs in Spanish secondary education teachers. Importantly, although there are different Spanish-speaking countries around the world, the present study focuses on the educational context of Spain, particularly on secondary education teachers. Thus, grounded in this framework, the aim of this study was to validate the BPNWS (called, in Spanish, BPWNS-Sp) in secondary education teachers. A subsequent aim was to examine the associations between teachers' experienced need satisfaction and engagement and burnout at work.

Based on the tenets of SDT and past studies that have measured the three BPNs separately using the BPNWS (e.g., Boudrias et al., 2014; Brien et al., 2012; Desrumaux et al., 2015; Sánchez-Oliva et al., 2016), we expected the BPNWS-Sp to show adequate psychometric properties for the three-factor structure. In addition, previous research recommends that validation studies should report invariance in terms of gender, age or other socio-demographic characteristics such as type of work center (Ayman & Korabik, 2010). A recent meta-analysis of basic psychological needs at work (Van den Broeck et al., 2016) reported that women tend to have higher levels of relatedness than men, although no differences in terms of autonomy and competence were found. Previous studies have measured invariance across gender of BPN satisfaction in professional and exercise participants (Sánchez-Oliva et al., 2016; Vlachopoulos, 2008), but there are no studies that have measured invariance across teachers' gender in terms of BPN satisfaction.

In Spain, another factor that could affect teachers' motivational processes in their work is the type of school (i.e., state or private) (Gil-Flores, 2016, Latorre & Sáez, 2009). Private school teachers report greater social recognition than state school teachers (Latorre & Sáez, 2009). However, a larger number of subjects to teach, more job hours, less income, or less job stability could negatively determine the well-being of teachers who work in private schools (Latorre & Sáez, 2009). Therefore, to be able to diagnose effectively possible differences between groups (i.e., gender, type of center) affecting teachers' BPN satisfaction, it is first necessary to develop invariant scales across these factors (Sánchez-Oliva et al., 2016). So, we further hypothesized that the BPNWS-Sp would be invariant across gender, type of school, and time.

This study aims to increase knowledge about the relationship between teachers' BPNs and their well-being at work to be able to effectively detect some factors that

could affect their work conditions. Consistent with past studies on teachers, we further expected that teachers' BPNs would significantly and positively relate to engagement (Klassen et al., 2012) and negatively to burnout at work (Van den Berghe et al., 2014).

Method

Participants

Initially, 584 secondary education teachers ($M_{age} = 45.04$; $SD = 8.97$) with mean working experience in teaching of 17.55 years ($SD = 10.26$) participated in the study. Then, to calculate stability across time, a second longitudinal sample was added with 79 secondary education teachers ($M_{age} = 46.46$; $SD = 8.04$) who had mean working experience of 18.61 years ($SD = 9.54$). Table 1 shows the characteristics of both samples related to gender, type of school, and regional (Aragon) and national (Spain) statistics concerning secondary education teachers working during the 2014/2015 academic year.

Procedure

An instrumental quantitative study was performed. The guidelines of the Declaration of Helsinki (2013) were followed for its development, with respect to consent and the confidentiality of replies. Cross-sectional data were collected over an online platform that remained active for 30 days. An e-mail was sent to all the 7418 secondary education teachers from the Aragon region (Spain) working during the 2014/2015 year. Teachers received a brief explanation of the study, the link for them to access the questionnaire, and the contact data of the main researcher in case they wanted to obtain more information. The response rate was 8%.

Table 1 Characteristics of the study samples and regional and national statistics concerning secondary education teachers working during the 2014/2015 academic year

	Study samples		Regional/national statistics*	
	$n_{cross\text{-}sectional} = 584$	Aragon = 79	Aragon = 7417	Spain = 262,279
Gender				
Men	254 (43.5%)	31 (32.4%)	3231	112,505
Women	330 (56.5%)	48 (67.6%)	4186	149,774
Type of school				
State	416 (71.2%)	79 (100%)	5279	199,746
Private	168 (28.8%)	0 (0%)	2138	62,533

* Regional (Aragon) and national (Spain) statistics correspond to the 2014/2015 academic year. These were provided by the Ministry of Education, Culture, and Sport (http://www.mecd.gob.es)

A complementary longitudinal data collection was conducted to calculate invariance of the BPNWS-Sp across time. Two secondary education centers were contacted to obtain their consent. After obtaining their approval, the cross-sectional sampling was conducted twice (seven-month interval) with the 106 teachers who were working during the 2015/2016 academic year in both educational centers. The interval between the two measurements was seven months (November 2015, May 2016). This interval-duration could be justified by the nature of the two educational centers and the work situation reality of Spanish secondary education teachers. In Spain, teachers are subject to a high workload in their daily work (Anaya & López, 2014). Thus, a shorter interval could have generated discomfort for the participants, triggering biased responses from the BPNWS-Sp. The response rate in terms of longitudinal data was 75%.

Variables and instruments

The Spanish version of the Utrecht Work Engagement Scale (Schaufeli et al., 2002) was used to measure teacher engagement. This scale comprises 17 items and three factors. Six items assess vigor (e.g., "When working I feel strong and vigorous"), five assess dedication (e.g., "I am enthusiastic about my work"), and six assess absorption (e.g., "When I am working, I forget everything else around me"). Responses were provided on a 6-point Likert-type scale ranging from 0 (*never*) to 6 (*always*). This scale showed adequate psychometric properties in previous studies with teachers (e.g., Nerstad, Richardsen, & Martinussen, 2010). In this study, a CFA was performed indicating adequate goodness-of-fit ($\chi^2/df = 4.12$, $p < .001$; CFI = .967; TLI = .963), except for RMSEA (= .010) that was close to recommendations, similarly to the results of Nerstad et al. (2010). However, the composite reliability analysis of the study sample obtained omega (ω) values of .88 for vigor, .92 for dedication, and .86 for absorption.

The Spanish version of the Burnout Clinical Subtype Questionnaire (BCSQ-12; Montero-Marín et al., 2011) was used to measure teacher burnout. This questionnaire is comprised of 12 items and distributed into three factors with four items each: overload (e.g., "I overlook my own needs to fulfill work demands"), lack of development (e.g., "My work does not offer me opportunities to develop my skills"), and neglect (e.g., "I give up in response to difficulties in my work"). Responses were registered on a 7-point Likert scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). A CFA was performed showing adequate goodness-of-fit ($\chi^2/df = 2.94$, $p < .001$; RMSEA = .058; CFI = .994; TLI = .993). The composite reliability analysis of the study sample obtained omega (ω) values of .90 for overload, .92 for lack of development, and .92 for neglect.

A Spanish translation (BPNWS-Sp) of the BPNWS (Brien et al., 2012) was used to measure satisfaction of BPNs in the teachers' work. The scale is comprised of 12 items, preceded by the sentence "At work in the school…", and distributed into three factors with four items each, which measure the satisfaction of autonomy, of competence, and of relatedness. The Spanish wording and English translation of the 12 items can be seen in "Appendix". Responses were provided on a 6-point Likert-type scale ranging from 0 (*strongly disagree*) to 6 (*strongly agree*).

The BPNWS-Sp was translated in agreement with Muñiz, Elosua, and Hambleton (2013). The original version of the BPNWS was translated into Spanish by two expert researchers in SDT and with a high level of French. Then, the two individual translations were reviewed and a final version was agreed upon. Finally, a native translator did a back translation of the version in Spanish to verify that there were no significant differences in the wording of the items compared with the original version.

Data analysis

Factorial structure

The descriptive statistics were calculated with SPSS 20. The rest of the models were calculated with Mplus 7.3. Exploratory Structural Equation Modelings (ESEM) and Confirmatory Factor Analysis (CFA) were conducted to test the factorial structure of the BPNWS-Sp. Following recommendations by Marsh, Morin, Parker, and Kaur (2014), ESEM models were estimated. Thus, all rotated loadings were freely estimated, subject to typical constraints imposed on the unrotated factor solution for identification purposes. An oblique Geomin rotation was chosen with an epsilon value of 0.5 (Marsh et al., 2014). CFA models were estimated according to the independent cluster model. Therefore, it was possible to load each item on a single factor, and the three factors were correlated. Standardized factor loadings (λ) and uniquenesses were reported (δ) for ESEM and CFA models.

Scale score reliability estimates were computed using two complementary parameters. First, composite reliability was calculated using McDonald's (1970) $\omega = (\Sigma|\lambda_i|)^2/([\Sigma|\lambda_i|]^2 + \Sigma\delta_{ii})$ where λ_i are the standardized factor loadings and δ_{ii}, the standardized item uniquenesses. In comparison with traditional scale score reliability estimates, such as Cronbach's alpha, ω has the advantage of taking into account the strength of association between items and constructs (λ_i), as well as item-specific measurement errors (δ_{ii}) (Dunn, Baguley, & Brunsden, 2014). Fornell and Larcker's measure of average variance extracted (Fornell & Larcker, 1981) was applied as a complementary measure of omega's composite reliability. The average variance extracted measures the amount of variance that is captured by the construct in relation to the amount of variance due to measurement error. When the average variance extracted is less than .50, the convergent validity of the construct is questionable.

Measurement invariance and stability

The BPNWS-Sp invariance was tested across gender and type of school. Four progressively more restrictive models were run for each of the two factors: (1) configural invariance; (2) weak invariance (i.e., invariance of the factor loadings/cross-loadings); (3) strong measurement (i.e., invariance of the factor loadings/cross-loadings, and intercepts); and (4) strict invariance (i.e., invariance of the factor loadings/cross-loadings, intercepts, and uniquenesses). These four steps assesse the presence of different types of measurement biases and are sufficient to accept that the measurement properties of an instrument are the same across groups (Chen,

2007). In addition, stability across time of the BPNWS-Sp was verified with a second longitudinal sample (seven month-interval; see the procedure section) by means of a test–retest correlation.

Nomological validity

To verify the nomological validity, the latent correlations analyses were computed between the BPNWS-Sp factors and the factors of engagement and burnout at work. Afterwards, a structural equation modeling (SEM) was carried out to corroborate this theoretic sequence. The standardized regression weights (β) and explained variance (R^2) were reported.

Goodness-of-fit

The assessment of the models (i.e., ESEM, CFA, and SEM) was based on the following goodness-of-fit indices: the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker–Lewis Index (TLI). Following the recommendations for interpreting these indices, lower values than .08 and .06 for RMSEA are considered acceptable and excellent, respectively (Marsh et al., 2014). In addition, for both CFI and TLI, values greater than .90 and .95 indicate adequate and excellent fit to the data, respectively (Marsh et al., 2014). Regarding the measurement invariance, the nested models were compared via consideration of changes (Δ) in goodness-of-fit indices, with increases in RMSEA of at least .015 or decreases in CFI and TLI of at least .010 indicates a lack of invariance (Chen, 2007). It is important to keep in mind that goodness-of-fit indices corrected for parsimony (TLI, RMSEA) can improve with the addition of model constraints. However, these improvements should be considered to be random.

Results

Factor structure and reliability

The descriptive statistics and item correlations for teachers' responses to the BPNWS-Sp are reported in Table 2.

The goodness-of-fit statistics of the alternative measurement models estimated are reported in Table 3. The ESEM (i.e. preliminary) and CFA (i.e. preliminary) were verified with three factors of the BPNWS-Sp. The initial model obtained in both did not show adequate values for the ratio χ^2/df and RMSEA (Marsh et al., 2014). As an alternative, a standardized error interaction per factor, obtained from the highest modification indices, was added to preliminary models (CFA and ESEM). As observed in Table 3, the final ESEM (ΔRMSEA $< .015$; ΔCFI $< .01$; TLI $< .01$) and final CFA (ΔRMSEA $< .015$; ΔCFI $< .01$; TLI $< .01$) showed a significantly better goodness-of-fit than their previous models. Therefore, this second proposal was accepted as final model of the BPNWS-Sp.

Table 2 Descriptive statistics and correlations for the items

	1	2	3	4	5	6	7	8	9	10	11	12
1. AS1	1											
2. AS2	.76	1										
3. AS3	.65	.69	1									
4. AS4	.56	.64	.57	1								
5. CS1	.32	.33	.41	.39	1							
6. CS2	.19	.20	.26	.22	.63	1						
8. CS3	.24	.28	.33	.30	.59	.73	1					
9. CS4	.26	.28	.32	.28	.47	.52	.51	1				
10. RS1	.29	.29	.28	.32	.24	.25	.28	.31	1			
11. RS2	.30	.29	.33	.29	.22	.19	.24	.35	.86	1		
12. RS3	.28	.29	.33	.33	.22	.14	.21	.30	.69	.79	1	
12. RS4	.21	.19	.22	.25	.18	.13	.14	.30	.55	.61	.70	1
M	4.68	4.66	4.90	4.73	5.16	5.16	5.13	4.58	4.78	4.79	4.61	4.14
SD	1.00	0.96	0.89	1.00	0.70	0.69	0.66	0.86	0.99	0.95	1.05	1.16

All correlations are significant at the $p < .001$ level

AS = autonomy satisfaction, *CS* = competence satisfaction, *RS* = relatedness satisfaction

Table 3 Fit indices for the analyzed models

	χ^2	*df*	χ^2/df	RMSEA [90% CI]	CFI	TLI
Preliminary model						
M1. ESEM	302.14*	33	9.15	0.118 [0.106–0.131]	.986	.973
M2. CFA	419.19*	51	8.12	0.110 [0.108–0.120]	.981	.976
Final model						
M3. ESEM	92.28*	30	3.07	0.060 [0.046–0.074]	.997	.993
M4. CFA	197.31*	48	4.11	0.071 [0.066–0.080]	.992	.990

Items related in models 3 and 4, 1 and 2 (autonomy), 6 and 7 (competence), 11 and 12 (relatedness)

CFA = confirmatory factor analyses, ESEM = exploratory structural equation modeling, χ^2 = Chi square, *df* = degrees of freedom, RMSEA = root mean square error of approximation, 90% CI = 90% confidence interval of the RMSEA, CFI = comparative fit index, TLI = Tucker–Lewis index

* $p < .01$

Thus, the parameter estimates associated with these final models are reported in Table 4. The ESEM was carried out first, as this might prove to be helpful in revealing sources of misfit in psychometric measures that would otherwise remain hidden in CFA (Marsh et al., 2014). As observed in Table 4, the 12 items appeared to be extremely well-defined in their own factor, although it was relatedness satisfaction that showed the highest factor loadings ($M = 0.82$; $\lambda = .67$–$.97$;), followed by autonomy satisfaction ($M = 0.78$; $\lambda = .63$–$.91$;) and competence satisfaction ($M = 0.77$; $\lambda = .59$–$.93$). Likewise, none of the items showed factor loadings greater than .20, in other factors. In parallel, in the subsequent CFA, all

Table 4 Standardized factor loadings (λ) and uniquenesses (δ) for the final ESEM and CFA solutions

Indicator	Final ESEM				Final CFA	
	As	Cs	Rs		λ	δ
	λ	λ	λ	δ		
Autonomy satisfaction						
1	*.85***	.02	.06*	.23	*.81***	.35
2	*.91***	.04*	.01	.14	*.85***	.28
3	*.76***	.14	.07*	.28	*.89***	.21
4	*.63***	.14	.14**	.43	*.79***	.37
Competence satisfaction						
5	.20**	*.72***	.03	.31	*.90***	.81
6	−.02	*.93***	.00	.14	*.78***	.61
7	.07*	*.85***	.05*	.19	*.81***	.66
8	.09*	*.59***	.19**	.49	*.77***	.60
Relatedness satisfaction						
9	.06*	.11**	*.85***	.18	*.91***	.83
10	.06*	.03*	*.97***	.04	*.99***	.90
11	.09**	*.02*	*.81***	.28	*.85***	.72
12	.00	*.04*	*.67***	.53	*.67***	.45

Italics = target factor loadings

AS = autonomy satisfaction, CS = competence satisfaction, RS = relatedness satisfaction

* $p < .05$

** $p < .001$

items were well-defined by significant and high factors loadings ($M = 83.5$; $\lambda = .67–.99$; $p < .01$). Because the analysis revealed similar fit indexes for both ESEM and CFA final models ($\Delta RMSEA < .0015$; $\Delta CFI < .01$; $TLI < .01$), and the ESEM model is less parsimonious than the CFA model, scale score reliability, invariance, and nomological validity were computed from the CFA standardized parameter.

Scale score reliability estimates were computed using omega coefficients of composite reliability and average variance extracted. Thus, the BPNWS-Sp composite reliability was good for the satisfaction of competence ($\omega = .89$) and excellent for autonomy ($\omega = .90$) and relatedness ($\omega = .92$). Regarding average variance extracted, the BPNWS-Sp showed adequate values in the three BPNs, being .70, .67, and .74, for the satisfaction of autonomy, competence, and relatedness, respectively.

Measurement invariance and stability

The invariance of the BPNWS-Sp was tested across gender (i.e., men = 254, women = 330) and type of school (i.e., state = 416, private = 168) based on the CFA model. The results from gender invariance tests (i.e., M4.1–M4.4) and type of school invariance tests (i.e., M4.5–M4.8) are shown in Table 5. Starting with a configural model, invariance constraints were progressively added to the factor loadings (i.e., weak invariance), intercepts (i.e., strong invariance), and uniquenesses (i.e., strict invariance). With regards to gender, it is relevant that all of these increasingly restrictive models provided an excellent level of approximate fit to the

Table 5 Invariance tests across gender and type of school for the BPNWS-Sp

Model	χ^2	*df*	RMSEA [90% CI]	CFI	TLI	CM	ΔRMSEA	ΔCFI	ΔTLI
Measurement invariance gender									
M4.1. Configural invariance	186.22*	96	0.057 [0.044–0.069]	0.964	0.950	–	–	–	–
M4.2. Weak invariance	205.11*	111	0.054 [0.042–0.066]	0.962	0.955	M4.1	−0.003	−0.002	+0.005
M4.3. Strong invariance	236.01*	122	0.057 [0.046–0.067]	0.954	0.951	M4.2	+0.003	−0.008	−0.004
M4.4. Strict invariance	276.51*	130	0.062 [0.042–0.064]	0.942	0.941	M4.3	+0.005	−0.012	−0.010
Measurement invariance type of school									
M4.5. Configural invariance	189.48*	96	0.058 [0.046–0.070]	0.962	0.948	–	–	–	–
M4.6. Weak invariance	211.52*	111	0.056 [0.044–0.067]	0.959	0.952	M4.1	−0.002	−0.003	+0.004
M4.7. Strong invariance	242.43*	122	0.058 [0.047–0.069]	0.951	0.947	M4.2	+ 0.002	−0.008	−0.005
M4.8. Strict invariance	261.25*	130	0.059 [0.048–0.069]	0.947	0.946	M4.7	+0.001	−0.004	−0.001

χ^2 = Chi square, *df* = degrees of freedom, RMSEA = root mean square error of approximation, 90% CI = 90% confidence interval of the RMSEA, CFI = comparative fit index, TLI = Tucker–Lewis index, CM = comparison model, Δ = change in fit information relative to the CM

* $p < .01$

data (CFI > .95, TLI > .95 and RMSEA > .06), except the strict invariance model (i.e., M4.4), which was situated very close to the cutoff. The configural, weak, and strong invariance did not exceed the cutoff recommendations for RMSEA ($\Delta > .015$), CFI ($\Delta > .01$), and ΔTLI ($\Delta > .01$). As observed in Table 5, only strict invariance showed a decrease that slightly exceeded the recommended cutoff for CFI (=.012) and was close to the guidelines. Nonetheless, the cutoffs for TLI and RMSEA were not exceeded, supporting the invariance across gender for the BPNWS-Sp in secondary education teachers.

The invariance results for type of school showed a similar fit for the data. In this sense, all invariance models, from the configural to the strict model, obtained an adequate goodness-of-fit showing indices that were very close, either above or below, to the recommendations. Moreover, none of these steps exceeded the recommended increment limits for RMSEA ($\Delta > .015$), CFI ($\Delta > .01$), and ΔTLI ($\Delta > .01$), supporting the complete invariance of the BPNWS-Sp across the type of school.

Finally, stability across time was calculated through the test–retest correlations analysis using a complementary longitudinal sample comprised of 79 secondary education teachers. After a 7-month interval, the test–retest correlations were .76 for autonomy satisfaction, .61 for competence satisfaction, and .81 for relatedness, indicating acceptable stability across time of the BPNWS-Sp in secondary education teachers.

Nomological validity

First, a latent correlation analysis was conducted to pre-analyze the BPNWS-Sp nomological validity (Table 6). CFA factors representing engagement at work (i.e., vigor, dedication, and absorption) and its opposite, burnout at work (i.e., overload, lack of development, and neglect), were added to the CFA model for the BPNWS-sp. All latent correlations obtained were statistically significant, showing consistency with SDT (i.e., positively with engagement at work and negatively with burnout at work).

Second, starting again with the CFA model and taking the hypotheses put forward as references, an SEM was performed showing adequate goodness-of-fit

Table 6 Latent correlations between BPNWS-Sp factors, engagement, and burnout at work

CFA solution	Autonomy satisfaction	Competence satisfaction	Relatedness satisfaction
Engagement at work			
Vigor	.41	.61	.35
Dedication	.48	.69	.42
Absorption	.37	.56	.34
Burnout at work			
Overload	−.22	−.16	−.24
Lack of development	−.44	−.35	−.36
Neglect	−.39	−.57	−.32

All correlations are significant at the $p < .001$ level

indices (χ^2/df = 4.40, $p < .001$; RMSEA = .07; 90% CI = .07–.08; CFI = .944; TLI = .938) (Marsh et al., 2014). In agreement with the SDT, as observed in Figure 1, the three BPNs significantly explained the majority of the factors of teacher engagement and burnout at work. Figure 1 shows the explained variance (R^2) of all the outcomes, which varied between 7% (overload) and 49% (dedication). Therefore, latent correlations and SEM seem to provide support to the nomological validity of the BPNWS-Sp to explain engagement and burnout at work in secondary education teachers.

Discussion

The Spanish validation of the BPNWS (BPNWS-Sp) could become an instrument that will help reflect the improvement of teachers' working conditions, given the evidence that indicates the importance of satisfying the three BPNs within the work context. Thus, taking the perspectives of the initial validation of the BPNWS (Brien et al., 2012) as reference and under the theoretical framework of the SDT, the objective was to validate the BPNWS-Sp into Spanish for secondary education teachers. In addition, the current study aimed to improve the knowledge of teachers' well-being by examining the associations between teachers' experienced need satisfaction and engagement and burnout at work.

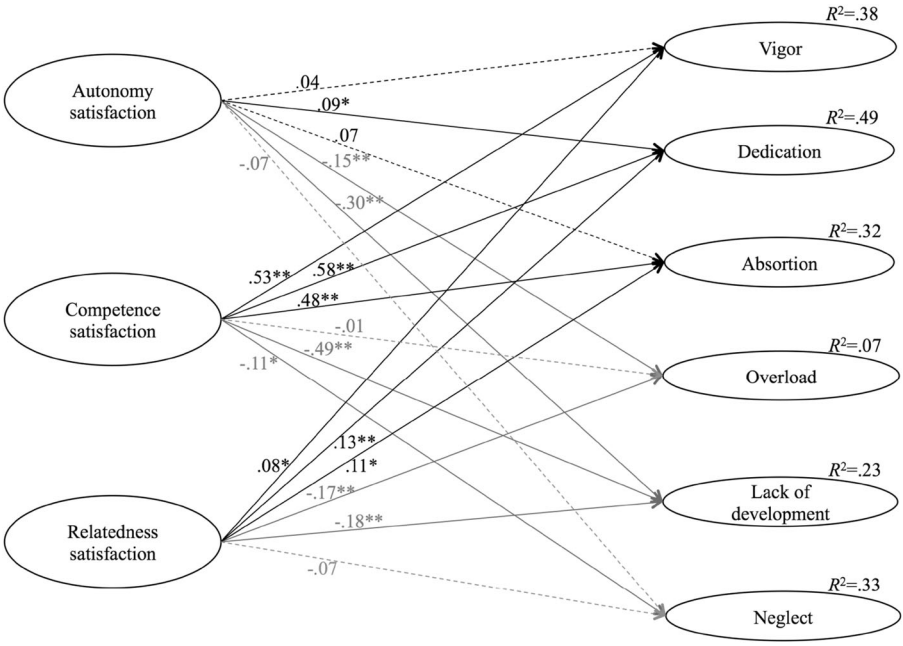

Figure 1 Structural equational modeling of the BPNWS-Sp with engagement and burnout at work. *Black arrows* identify a positive explanation, *grey arrows* identify a negative explanation, *dotted arrows* identify a non-significant explanation, R^2 over latent variable. *$p < .05$, **$p < .01$

The goodness-of-fit indices of the ESEM and CFA models of the BPNWS-Sp reveal a three-factor structure with four items per factor that adapts to the Basic Psychological Needs Theory (BPNT) (Deci & Ryan, 2000), in a similar manner to the CFAs obtained with French and Canadian teachers in the validation study of the BPNWS (Brien et al., 2012). The ESEM results indicated how all items of the BPNWS-Sp had a greater cross loading weight in their own factor than in the rest. These results suggest that assessing the satisfaction of the three BPNs separately may be more relevant in secondary education teachers than assessing a global need satisfaction factor, as it occurs in some research studies (e.g., Janke et al., 2015). Returning our attention to the final CFA model, all the factor loadings were statistically significant, thus considerably contributing to the assessment of the construct. Regarding BPNWS-Sp score reliability, the results are in agreement with the initial validation of the scale (BPNWS; Brien et al., 2012), and with other studies that have used the BPNWS with French-speaking teachers (Boudrias et al., 2014; Desrumaux et al., 2015). However, in these studies, only Cronbach's alpha was used as an indicator of internal consistency. In addition, Cronbach's alpha could be biased by the number of items, so only using this indicator as proof of internal consistency (Dunn et al., 2014) does not seem advisable. In this sense, unlike previous studies that have used the BPNWS, the composite reliability was computed using omega and the average variance extracted in this validation, obtaining good results in the three BPNs, which strengthens and sustains the reliability of the BPNWS-Sp (Dunn et al., 2014).

Likewise, the multigroup confirmatory analyses also confirm the invariance of the BPNWS-Sp with respect to gender and type of school, which are the two factors that may influence teachers' motivation (Gil-Flores, 2016; Latorre & Sáez, 2009). This could represent an advance in the development of the BPNSW in secondary education teachers, because in the initial validation (Brien et al., 2012) the invariance was only tested between two samples belonging to different countries. However, Brien et al. (2012) did not take into account some variables which may affect teachers' motivational processes. Moreover, based on one of the limitations provided by Brien et al. (2012) in the validation of the BPNWS, stability across time was calculated, obtaining a good test–retest reliability in the three factors. This, together with the results obtained from the ESEM and CFA, support the hypotheses put forward in the study, and defend the internal validity and reliability of the BPNWS-Sp.

Regarding the nomological validity of positive outcomes of the BPNWS-Sp, the latent correlational results showed significant and positive relations between the three BPNs and teacher engagement at work, consistent with theoretical tenets of the SDT. These findings are in agreement with those found by Brien et al. (2012) in the original validation of the BPNWS, where the teachers' satisfaction of the three BPNs was positively related to optimism, intrinsic motivation, well-being, and justice. Similarly, Boudrias et al. (2014) and Desrumaux et al. (2015) found significant and positive relations between the satisfaction of the three BPNs and well-being at the workplace in two studies with French-speaking teachers that used the BPNWS (Brien et al., 2012). With respect to the results obtained in the SEM in this study, the three BPNs positively explained some factors of teacher engagement.

The findings obtained in the teachers' autonomy and competence are in agreement with those shown by Klassen et al. (2012) with Canadian teachers. However, whilst Klassen et al. (2012) showed autonomy as the most influential need to predict teacher engagement, the results obtained in this study indicate the possible importance of satisfying teacher competence. These differences could be the result of Klassen et al. (2012) having used an instrument to measure the BPNs that was not specific to the teaching context (Brien et al., 2012), a professional field where perceived competence may be essential for adequate performance (Collie & Martin 2017). Finally, regarding relatedness, the findings obtained in this study are contrary to those obtained by Klassen et al. (2012), where relatedness negatively explained teacher engagement. However, the results obtained in the SEM of this research are in line with those of the SDT, maintaining the importance that satisfying the three BPNs may have for adequate teacher engagement.

In connection with the predictive capacity of the negative outcomes of the BPNWS-Sp, the latent correlations established between satisfying the three BPNs and teacher burnout are in agreement with the theoretical framework of the SDT (Deci & Ryan, 2000). These findings are in line with previous research studies that have used the French version of the BPNWS (Brien et al., 2012) with teachers, which found a negative relationship between BPNs and anxiety (Boudrias et al., 2014; Desrumaux et al., 2015). Likewise, the results are similar to those obtained by Van den Berghe et al. (2014), where the satisfaction of the three BPNs was negatively associated with teacher burnout. Regarding the results of the SEM of this study, the strong predictive and negative value of competence towards neglect is noteworthy. Thus, the results confirm the initial hypothesis and indicate that if the teachers' BPNs are satisfied, especially the competence need, this could increase their engagement and prevent burnout at work, reducing the behavioral indifference in the workplace (Montero-Marín et al., 2011).

Implication for practice

Recent research reveals that teachers are the most important factor in influencing student learning (Marshik et al., 2016). Therefore, teachers' health and satisfaction at work should be a priority factor to improve the educational system. However, in Spain, teachers have experienced a pronounced decrease in their well-being at work, especially secondary education teachers (Anaya & López, 2014).

Working in a school context where the three BPNs are supported by the school environment relates positively to teachers' BPN satisfaction and well-being (Baard et al., 2004; Lee & Nie, 2014). Validating the BPNWS-Sp could prove helpful to know to what extent teachers have satisfied their BPNs, one of the most relevant antecedents of their well-being (Klassen et al., 2012). So, if through the BPNWS-Sp, teachers, headmasters, and the educational administration can know which BPNs need to be further supported, strategies focused on improving their autonomy, competence, and/or relatedness satisfaction at work could be designed and implemented.

To illustrate this, the educational administration could support the teachers' need for autonomy by developing a more open and consensual curriculum with them and

providing higher quality resources in classrooms. Similarly, headmasters could support autonomy by providing academic freedom in teaching, asking, and listening to teachers' concerns and being more flexible with regard to developing curricular and extracurricular activities based on common interests of both teachers and students. Providing the opportunity to attend conferences and offering courses funded by the educational administration to stimulate professional development (e.g., training in BPN support towards their students) could support teachers' need for competence. Likewise, both school policy makers and headmasters could provide positive feedback about the efforts that teachers put into their work to satisfy their competence need. Finally, relatedness satisfaction can be nurtured through support from the educational administration and headmasters to the performance of interdisciplinary projects. In this way, the relationships between teachers who belong to different areas and students from different courses can be supported, creating a friendlier working environment in schools.

Limitations of the study and implications for future research

However, some limitations and perspectives must be taken into consideration. Firstly, the BPNWS-Sp items related to relatedness satisfaction refer exclusively to the teachers' relationship with their co-workers. A new avenue of research could be to elaborate and adapt new items to assess teachers' relatedness satisfaction with other significant agents of the school environment (i.e., headmasters, students, or parents). It would allow the school policy makers to know to what extent the teachers' relationships with other agents could be relevant for their well-being, and elaborate more adapted school policy strategies in order to satisfy this BPN. Secondly, the BPNWS-Sp has been validated into Spanish to be used with secondary education teachers from the Aragon region (Spain). Further research is needed to examine this scale at other education levels and in other Spanish-speaking countries (i.e., South American countries). In addition, due to the nature of the BPNWS-Sp items, future research could examine the validity of the BPNWS-Sp to measure the satisfaction of BPNs in other professions and in other Spanish workers. Thirdly, although the explanatory capacity of the BPNWS-SP shows evidence of positive and negative outcomes such as burnout and engagement at work, the SEM of the present study was conducted with cross-sectional data, and causality in relationships cannot be inferred. Future studies using longitudinal or experimental designs are needed to extend these findings and to examine the causal and long-term effects of teachers' BPN satisfaction on different outcomes at the workplace. Finally, the seven-month interval to test BPNWS-Sp invariance across time could also interfere in the stability of each dimension (i.e., autonomy, competence, relatedness). Future research should test the stability of the scale with a shorter interval between the first and the second measure.

Conclusion

To conclude, the Spanish version of the BPNWS (BPNWS-Sp) seems valid and reliable to assess the satisfaction of the three BPNs in secondary education teachers. It can also be used as an instrument to examine and predict health and well-being in the workplace. These results have important practical implications in the school context that should be taken into account to satisfy teachers' BPNs. Finally, although this scale was tested with a sample of secondary education teachers, the nature of the items allows future researchers to examine the need satisfaction with other Spanish-speaking workers. Similarly, this study proposes a valid and reliable Spanish measure of need satisfaction at work that could contribute to the feasibility of cross-cultural studies conducted across Spanish-speaking countries.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Appendix

See Table 7.

Table 7 Spanish and English versions of the BPNWS

Spanish version (BPNWS-Sp)	English version (BPNWS; Brien et al., 2012)
1. Mi trabajo me permite tomar decisiones	1. My work allows me to make decisions
2. Puedo tomar mis propias decisiones para resolver problemas relacionados con el trabajo	2. I can use my judgment when solving work-related problems
3. Puedo asumir responsabilidades en mi trabajo	3. I can take on responsibilities at my job
4. En mi trabajo, me siento libre para realizar las tareas a mi manera.	4. At my work, I feel free to execute my tasks in my own way.
5. Tengo la capacidad de hacer bien mi trabajo	5. I have the ability to do my work well
6. Me siento competente en el trabajo	6. I feel competent at work
7. Soy capaz de resolver problemas en el trabajo	7. I am able to solve problems at work.
8. Tengo éxito en mi trabajo	8. I succeed in my work
9. Cuando estoy con los compañeros/as de mi trabajo, me siento comprendido/a	9. When I'm with the people from my work environment, I feel understood
10. Cuando estoy con los compañeros/as de mi trabajo, me siento escuchado/a	10. When I'm with the people from my work environment, I feel heard
11. Cuando estoy con los compañeros/as de mi trabajo, siento que puedo confiar en ellos/as	11. When I'm with the people from my work environment, I feel as though I can trust them
12. Cuando estoy con los compañeros/as de mi trabajo, siento que soy un amigo/a para ellos	12. When I'm with the people from my work environment, I feel I am a friend to them

Autonomy satisfaction = items 1–4, Competence satisfaction = items 5–8, Relatedness satisfaction = items 9–12

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